SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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No. 2262.—VOL. XLVIII. LONDON SATURDAY, DECEMBER 28, 1878. PRICE (WITH THE JOURNAL) SIXPENCE. PER ANNUM, BY POST, £1 4s.

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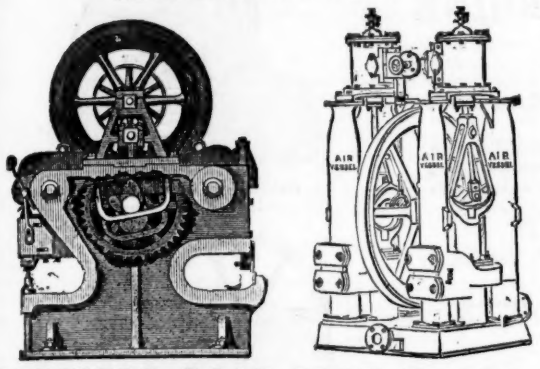

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PARIS, BRONZE MEDAL, 1867.

ORDER OF THE CROWN OF PRUSSIA.

FALMOUTH, SILVER MEDAL, 1867

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the Geographical Congress, Paris, 1875—M. Favre, Contractor, having exhibited the McKean Drill alone as the MODEL BORING MACHINE for the ST. GOTHARD TUNNEL.

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At the south end of the St. Gothard Tunnel, where

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Are exclusively used, the advance made during eight consecutive weeks, ending February 7, was 24·90, 27·60, 24·80, 26·10, 28·30, 27·10, 28·40, 28·70 metres. Total advance of south heading during January was 121·30 metres, or 133 yards.

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The GREAT WESTERN RAILWAY has adopted these Machines for the SEVERN TUNNEL; the LONDON AND NORTH-WESTERN RAILWAY for the FESTINIOG TUNNEL: and the BRITISH GOVERNMENT for several Public Works. A considerable number of Mining Companies are now using them. Shafts and Galleries are driven at from three to six times the speed of hand labour, according to the size and number of machines employed, and with important saving in cost. The ratio of advantage over hand labour is greatest where the rock is hardest.

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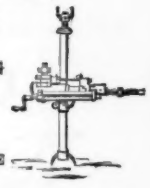

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"7. Its greater power is some FORTY PER CENT. in favour of the Ingersoll."

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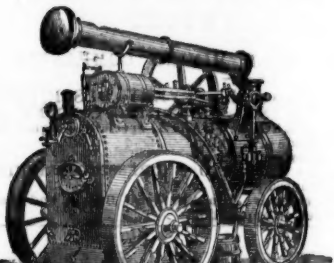

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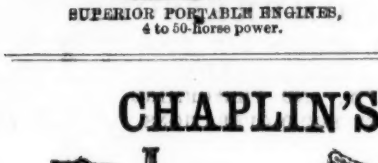

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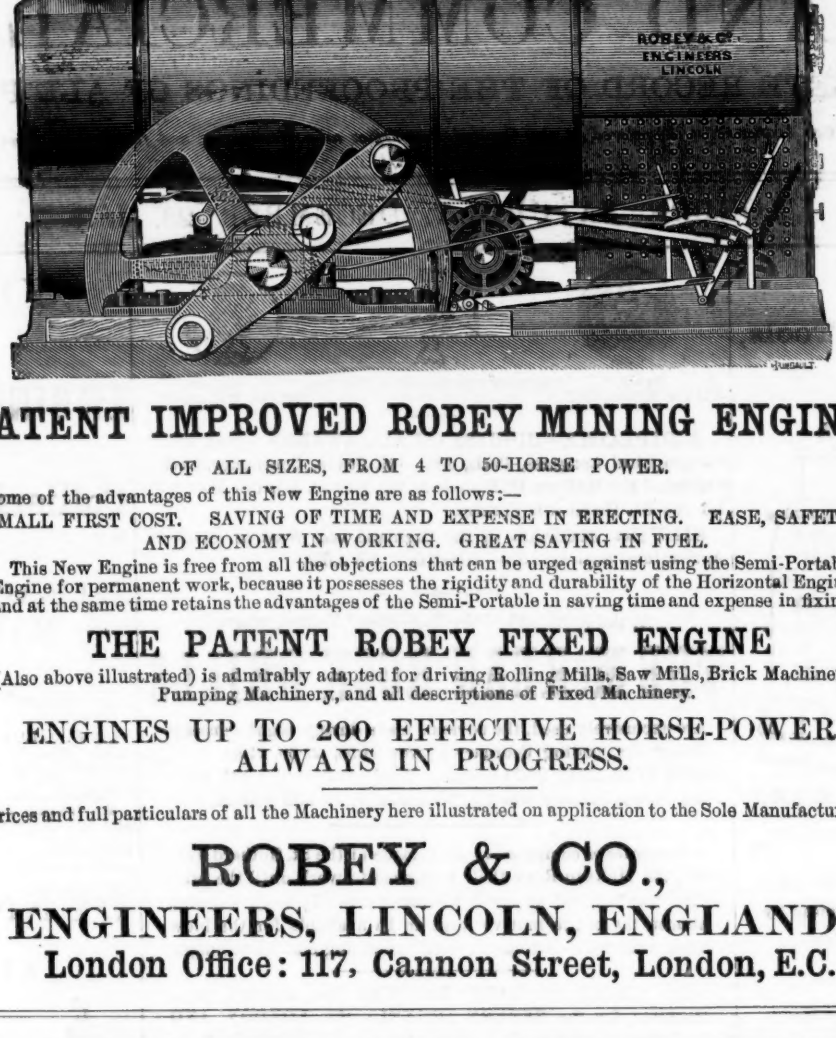

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This New Engine is free from all the objections that can be urged against using the Semi-Portable Engine for permanent work, because it possesses the rigidity and durability of the Horizontal Engine, and at the same time retains the advantages of the Semi-Portable in saving time and expense in fixing.

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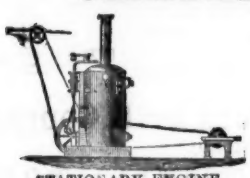

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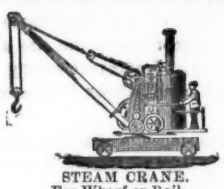

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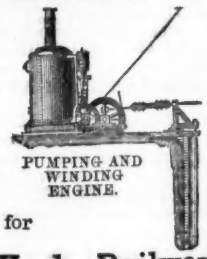

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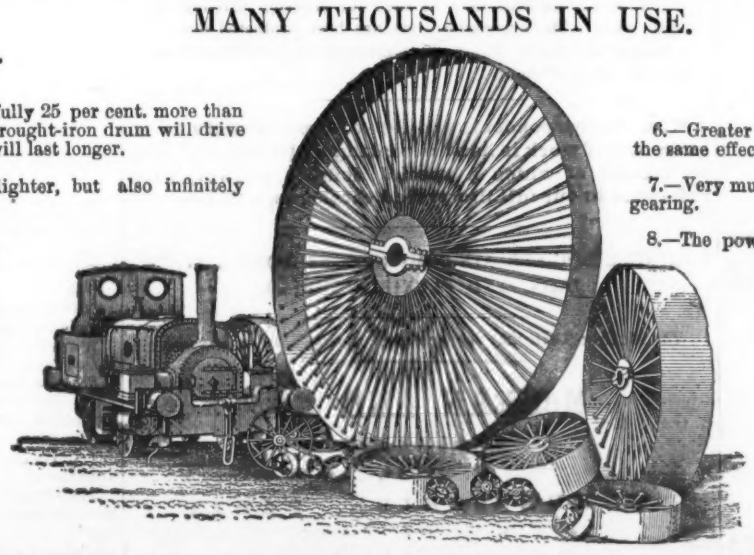
1.—Leather belts on these drums will drive fully 25 per cent. more than on cast-iron ones—viz., a 6 in. wide belt on a wrought-iron drum will drive as much as an 8 in. belt on a cast-iron one, and will last longer.

2.—These drums are not only considerably lighter, but also infinitely stronger than cast-iron ones.

3.—In case of damage from Fire they are easily repaired. We have repaired hundreds at a small cost.

4.—For MAIN DRIVING purposes they are invaluable, especially in case of a new mill, no expensive ashlar work being required to withstand the jars of costly gearing.

5.—The wrought-iron drums and belts cost less and are more easily fixed than gearing.



ADVANTAGES.

6.—Greater economy in steam power, as it requires less power to transmit the same effective force with belts than it does with gearing.

7.—Very much greater economy in subsequent repairs as compared with gearing.

8.—The power is transmitted evenly, faithfully, noiselessly, and without the jar arising from defective or worn gearing.

9.—They require no cases for transport or shipment.

They can be supplied up to

24 FEET DIAMETER.

FOR PRICES AND PARTICULARS APPLY TO THE SOLE MAKERS,

HUDSWELL, CLARK, AND RODGERS, RAILWAY FOUNDRY, HUNSLET, LEEDS.

Original Correspondence.

SILVER MINES, NEW SOUTH WALES.

SIR,—We have over 14,000 practical (?) miners in New South Wales, and I feel sure that not one in a thousand of them would know silver ore if he accidentally came across it.

Of the various mines of various minerals at work over 300,000 miles of territory I am certain there are not ten managers who have been scientifically trained, or do much more than work by mere "rule of thumb."

Of all the mines ever started here not a score, and probably not even ten, ever had a fair amount of assured capital to start with, so that the work could be properly laid out at first, with a view to the ultimate economical and profitable working of them; and if, after the expenditure of a few thousands (and in 19 cases out of 20 of only a few hundreds even) dividends were not forthcoming, shareholders refused to pay calls, and the whole thing collapsed when probably the real difficulties were over, and success at hand.

With the great Comstock Mines, in California, the first adventurers sunk over 30,000*l.*, and caved in, and the next party spent about another 50,000*l.* before success was finally achieved—that success meaning over 20 million dollars up to the present. But no such pluck and perseverence has ever been shown in this colony nor even a tenth of it on any one property. Nor is there likely to be whilst banks give 7 per cent. interest for fixed deposits, and there is almost unlimited room for profitable investment in stock and stations, or until some really strong properly worked company takes a likely mine in hand, and deals with it in a business-like manner and makes it a success—and then, the way having been shown them, there will be plenty of investors bold (?) enough to go and do, or try to do, likewise; and New South Wales will at last be able to show the world that her various and wide-spread surface indications were true pilots after all to the wealth hidden beneath.

These few remarks may, perhaps, partly explain why the reefs referred to in the following official report have so long lain unnoticed, and even now there is not one Sydney capitalist interested, or likely to take an interest, in trying to develope what seems to certainly offer a fair chance of fair profit, with no very great initial outlay or ultimate risk.

GOLD AND SILVER DISCOVERIES AT BOOROOK, NEW SOUTH WALES.

The following official letter has been handed to us for publication:—

"Warden's Office, Tenterfield, Oct. 11.

"SIR,—In consequence of hearing of further important discoveries at Boorook I again visited that locality on the 7th and 8th instant. The following reefs have been discovered since my last visit there:—

"No. 1, Woolshed reef, about 3½ miles N.N.W. from Boorook station.

"No. 2, Alderman reef, in the same locality as the Woolshed reef.

"No. 3, Cornstalk reef, about a quarter of a mile east of the Nil Desperandum reef, and a mile and a-half north from Boorook station.

"No. 4, Golden Crown reef, about 10 chains west of the Addison reef.

"No. 5, Curren's reef, about a mile and a-half north from Boorook station.

"On the Woolshed and Alderman reefs there have been several applications for leases; the reefs appear well defined, and are at present about 2 ft. wide; the whole country in this locality is intersected with reefs at present untried. The stone from the reefs now opened—the Woolshed and Alderman—show, when burnt, good silver. Very little work has been done, in fact they have only just been opened sufficient to show the reefs. The Woolshed reef runs east and west, and the Alderman, although only distant about 200 yards, runs N.E. and S.W. it is supposed the reefs meet.

"The Cornstalk reef is also about 2 ft. wide, the stone shows good silver on being burnt.

"The Golden Crown reef runs parallel with and about 10 chains distant from the Addison reef, and, although only on the surface, shows splendid stone. I broke up a piece of the reef, and obtained a good show of gold, and the stone appears to me very rich in silver ore. This reef has been traced for some considerable distance, and a number of leases have been applied for on it.

"The prospectors believe the Curran reef is rich in silver. I have not yet seen any of the stone. Several leases have been applied for on the reef.

"Of the various reefs (excepting Curran's) I forward you specimens of stone, per Cobb and Co., for analysis. I should recommend the analysis of the stone for public information for the reasons that silver ore is a new mineral to the great majority of our miners; and now that there is little doubt but that payable silver exists over a large area in this district, and probably in other parts of the colony (although not discovered or recognished from want of knowledge by the miners, and the difficulty of recognising silver ores) any information that can be given to the public, or any help to this new and important industry, can be but beneficial to the mining interests.

"While at Boorook I again visited the machine now working there, and the various reefs previously reported on by me, particularly the Addison and Golden Age. I found very little alteration in the working, or the means used for saving the silver; the battery, as I have previously mentioned, is a three-stamper one, driven by a pit horse-power engine, in connection with this battery a Burdan machine is worked.

"The shift after crushing is run over blankets, and what is saved in that way is passed through the Burdan machine for amalgamation with quicksilver; only about one-fifteenth (1-15th) of the stone crushed is treated in this way, the remainder (that which passes over the blankets) is run into sludge pits and saved for further treatment.

"The means of saving are, in my opinion, and also in the opinion of the proprietors of the machine, quite inadequate for the purpose of extracting silver ore, and I am convinced that not one-fourth of the silver out of the stone crushed is obtained.

"The assay made of the tailings or refuse from this Burdan machine forwarded with my report of July 10 last went 8 ozs. gold and 446 ozs. silver to the ton, clearly proving that the process of amalgamation by the Burdan machine now adopted saves only a small proportion of the silver. The loss in this way and the treatment only of 1-15th of the stone crushed warrants one in coming to the conclusion that not one-fourth at the very most is saved.

"The saving on blankets is a good process for gold or other very heavy mineral; but not for silver ores, such as chlorides and sulphurets, the specific gravities of which are scarcely greater than the sludge. In order to have this property tested I forward samples fairly taken as follows:—

"1.—From the machine just as it comes out of the stamper-boxes.

"2.—From the blankets (that is, the stuff which is treated on the Burdan machine, and from which only, at present, the silver is obtained).

"3.—Tailings from Burdan machine after treatment.

"4.—Tailings from the blankets now saved in sludge-holes for further treatment.

"The samples respectfully recommend be assayed, and that I may be favoured with the results. The stone from which these samples have been taken was obtained at about 50 ft. deep, on the Golden Age reef.

"The proprietors of the machine, Mr. Thomas Horton and his partners, have purchased a Wheeler's pan, which is said to be a far better process of amalgamation than the Burdan machine. It is not yet on the ground, but is expected shortly; when it is fairly at work I shall report on the results.

"The great drawback to the development of these mines is the want of capital by the present holders and applicants for leases, and the fear of capitalists to enter into any mining speculation; but this will only be temporary, for I have no doubt but that the most sceptical will soon be convinced that a wonderfully rich field exists at Boorook.

"Mr. Horton is at present crushing stone from the 50 ft. level on the Golden Age, a specimen of which I send you. In spite of the great loss [illegible] averages over [illegible] and partial treatment of stuff the yield now [illegible] to 12 hours' crushing. During the 12 hours only about 5 or 6 tons of stone can be crushed, and out of that not one-half is treated, so that the 100 ozs. of silver is actually from that quantity.

"In my previous report I informed you that the machine was about three miles from the Golden Age Reef, and the stone had to be carted that distance. The carting is attended with great difficulty, the road is very bad, and there has been little or no grass until lately; in consequence of these and other drawbacks the machine does not average eight hours work a day, but during the last month or five weeks no less than 2800 ozs. of silver have been retorted and sent away from this small machine.

"Machinery could be placed close to the Addison and Golden Age reefs, and machine sites have been secured for that purpose; there is a probability of machinery soon being placed on the ground. Arrangements, I am informed, are now being made for another five-stamper battery, and if that succeeds a 35 stamper. I hope before long to be able to report that the field is in full work.

"I am collecting specimens of the various silver stones for the Mines Department. "J. B. GRAHAM, Warden."

Note the "plant" now at work and its capability (?) for the proper working of such ores; and, as to the 35-stamper one, when it is up I will believe it, but certainly not till then, and should it be done it is certain to be a hybrid of two or three idle plants specially made for quartz crushing, and the probable manager is as little likely to understand the proper treatment of silver ore as ——.

As a further proof of an utter want of energy and ignorance of hydraulic mining there is one property of about 2000 acres which has been tested in various places, and the alluvial gold in it roughly estimated at two millions sterling, the cost for bringing the water to ground sluice, which would not exceed 50,000*l.*, and the washing of of it down probably another 100,000*l.*, and yet there it lies idle, and is likely to do so—whilst were it in California there would be a dozen of powerful companies competing for the privilege to do it.

Sydney, New South Wales, October. R. D. ADAMS.

AUSTRALIAN TIN MINING.

SIR,—There have been some most absurd and grossly exaggerated statements in one of the leading English papers as to late discoveries in Tasmania, and the matter has been so ably handled here by one of our leading tin smelters, that I beg to enclose you his article for publication, with the view of letting the general public see what absurd statements *do* at times gain currency, and to put them on their guard for the future. R. D. ADAMS.

Sydney, N.S.W., Oct., 1878.

OUR FUTURE TIN INDUSTRIES.

SIR,—On Dec. 8 last you published my first letter on this subject, the object of which was to indicate the conditions under which successful tin mining is conducted in the Old Country, the geological formations in which the ore is found, the minerals with which it is usually found associated, the different methods of mining for the ore, and the small yield which could be made to pay in cases where economical methods of treatment were employed. Then by instituting a comparison between the mines being worked at home and those known to exist here I endeavoured to show that there is a great future for the tin trade in these colonies, after the stream works shall have become exhausted, by turning our attention to the tin lodes which we know to exist in this country.

The present letter, however, has not for its object any further discussion of this branch of the subject, but aims at directing attention to and exposing the very extraordinary statements appearing from time to time in some of the leading English journals in reference to the tin produce of the Australasian colonies, statements which, if allowed to pass unchallenged, may exert a very prejudicial influence on this branch of our commerce. A review of the different statements that appear, exhibits at a glance the constant shifting of position of the different contributors, according to the object they may have to serve at the time. For instance, a contributor will one day stoutly maintain that the Australian stream tin is nearly exhausted; and at another time, having a different purpose to serve, will publish detailed particulars of discoveries of fabulous extent and richness, drawing, of course, in each case on his imagination for facts.

Towards the end of 1873 the *Mining Journal* used to contain letters seeking to prove that the Australian production of tin was of no moment, and never could be of any importance. These letters alluded to "small deposits" in Australia, and laid it down authoritatively that "the deposits of Australia cannot be worked and exported to this country, except when tin is very scarce and dear here." I took occasion to put the writer in possession of my opinion on these subjects, and in my letter of Nov. 3, 1873, to the *Mining Journal*, published on Dec. 27, I explained what our "small deposits" were, and promised the *Mining Journal* that Australian tin would be shipped home, even when it was not "very scarce and dear," putting the boot on the other leg, and suggesting the possible early extinction of the majority of the British tin mines. At the same time I pointed out that for many years the consumption had stood at about 12,500 tons, and had lately doubled owing to the employment of the metal for several new purposes, and the cheapening of the price, while a further augmentation of consumption would be sure to follow the inevitable increase of production and cheapness of price consequent upon Australian discoveries.

Just about that time the appearance of our Australian tin in the London market began to affect the high price then ruling, and the trade gave it anything but a hearty welcome. The attempt to snuff us out had failed, and as the illusion gradually disappeared other devices were resorted to to handicap the intruder. Some members of the trade combined to purchase Australian metal to arrive, subject to survey of quality and allowance for inferiority; the allowances often ranged from 2*l.* to 10*l.* per ton, the tin being declared by the surveyors to be to that extent inferior to "best English refined." After the trade had purchased, subject to these alterations, Australian metal went into the melting pot, and on being ladled into fresh moulds, lo! presto! it came out "best English refined." In conducting the metallurgical operation, only three essentials were required—the requisite skill to ladle into other moulds, the status conferred by a position of undoubted respectability to ensure the genuineness of the article, and unblushing audacity. It paid well, alas! too well, for it was found that inferior English tin put into the pot with good Australian made very fair "best English refined." Some little competition naturally sprang up in the trade; and, in spite of all obstacles, Australian asserted itself.

Passing over the records of the various ingenious devices which have from time to time been resorted to to shape the course of the tin market, to suit the requirements of the different writers, I now bring before your readers an article which for fertility of invention and unblushing mendacity completely outstrips any of its predecessors. I would premise by saying it is not by the author of "Baron Munchausen," nor the "Comte de Monte Christo," it is the production of a firm largely interested in the metal markets, and appears in one of the leading London journals, under the sensational heading of "A Mountain of Tin." It details in a circumstantial manner some of the methods of collecting tinstone at the antipodes, dilates upon the improved modes of communication being made for the transport of material, and *inter alia* records the following item of information, which I can characterise by no less forcible (though rather inelegant) expression than "flabbergasting":—

"The mining district of Mount Bischoff has now found a rival in the discovery of a tin mountain at Mount Heemskirk, on the West Coast. The 'washdirt' is some 20 ft. thick, and produces about 25 per cent. of tin; but the existence of solid seams of the metal traversing the mountains in veins several feet in depth and width has thrown even these productive workings into the shade. Some 'nuggets' weighing several hundredweights have been found, yielding nearly 100 per cent. of pure metal. Mixed with the tin ore is a little gold, about 10 ozs. to the ton, not sufficient in itself to render it worth seeking, but adding considerably to the tin miner's profits." Again, "A service of provision ships has been organised, and this hitherto neglected part of the country will soon become a centre of mining activity."

Well Mr. Editor, this revelation, astounding as it is, has astonished nobody more than the tin producers out here at the antipodes. They had no idea of the vastness of their riches, and have only just been awakened by this article to a sense of their financial status. It does appear such arrant folly to send to England to float a loan of a few paltry millions, whilst we have amongst us whole communities of Monte Christos:—albeit, they wear red shirts, work hard with pick and shovel in all weathers, sleep in rude huts, and bake their own damper. Cunning dogs!—they did not wish all the world to know of the extent of their wealth; but somehow or other it slipped out, got into one of the leading papers at home, was re-copied into another of good repute, at last everybody got to know it. Keen business men at home, and even our sharp American cousins devoured this romance. The agent of the *Mining Journal* in New York is reported to have predicted that tin would drop to 40*l.* per ton; and by the last mail I received a copy of that article, accompanied with a request that I would report upon its credibility or otherwise. In my reply, I endeavoured to deal with the subject on its merits, as the following extract will show:—

"The extract you enclose from one of the London papers, and the remarks of the correspondent of the *Mining Journal*, deserve special comment; the folks who are bearing the market have overshot their mark, and the article exhibits conclusively the writer's real or pretended ignorance of the mode of occurrence of tinstone, as well as his thorough belief in the credulity of his readers. It is strange that such a transparent article should pass current for a day without reply. I am in correspondence with some of the shareholders of this 'Mountain of Tin,' and at the present ruling price for ore they cannot raise and ship a single ton without loss. There is no place there where the 'washdirt' is 20 ft. thick, producing 25 per cent. of tin; isolated 'patches' yield 25 per cent. of ore, but they are only 'patches.' In places the tin-producing ground is far thicker than 20 ft., but the rock has to be mined, raised, crushed, and dressed, at a cost of seldom less than 20*l.* to 25*l.* per ton; the transit costs fully 10*l.* per ton more, and its value here is scarcely 35*l.* per ton. In no part of the world has metallic tin been discovered; it does not exist in nature. This part of the tale, therefore, is at variance with natural law; and though we are at the antipodes, nature obeys the same laws here as elsewhere. No nuggets of several hundredweights have been found, and as the highest possible yield of chemically pure oxide of tin is only about 76½ per cent., it follows that it is not possible for it to yield 'nearly 100 per cent. of pure metal.' The 'small quantity of gold—about 10 ozs. to the ton—not sufficient in itself to render it worth seeking,' caps the joke most completely. Here we work at a profit, alluvial wash giving six pennyworth of gold per ton, and some much less. At the deep sinking in Ballarat, they work the old river beds, at a depth of 400 ft. with a yield of 2 dwts. to the ton, and pay enormously. Quartz reefs are mined and crushed for 3 dwt., and pay. Now, 10 ozs. is worth 35*l.*, and if the tin wash gives 25 per cent., it follows that the dressed tin will contain 40 ozs. per ton, worth 140*l.*, while the tin would only be worth 25*l.*, and the ground would, therefore, be worked for gold, not for tin. But, strange to say, not a single ounce of gold has yet been raised, nor, as far as I know, a single speck. As a matter of fact, tin exists in granite and mica schist country, gold rarely; when found together it is always in a 'detritus,' far removed from their individual habitats; and in such cases tin ore is sparsely distributed, and rarely worth collecting."

Now, Mr. Editor, as to the effects of this *Montagne en travail* which has brought forth, not a mouse, but a depression in the tin markets of the world, that has quite paralysed production—thrown the whole machinery of the trade out of gear, and produced a violent *bouleversment*, which must precipitate an equally violent reaction. At the present moment only two of the fourteen tin furnaces in Sydney can keep going, notwithstanding that the consumption of tin has actually increased to 35,000 tons per annum, and it is daily being applied to new uses.

The strangest part of the business is that a tale so manifestly absurd as the "Mountain of Tin" should have obtained currency, without being disproved by scientific men, who must have perceived its weak points.

It is to be regretted that there is no way of dragging into the light and exposing the authors of such flagrant articles; but we may derive some consolation from the hope that the editors of papers of repute, who have allowed themselves and their readers to be so bamboozled, and who have been the innocent cause of so much mischief, while ministering to the cupidity of their designing correspondents, will, in future, be on their guard as to the sources whence they derive their information. S. L. BENSUSAN.

Kangaroo Tinworks, Oct. 24.

MINING COMPANIES' DEBENTURES.

SIR,—The question raised in last week's *Mining Journal* with regard to the respective position of shareholders and of debenture-holders, in case of only a portion of the debenture capital created by a resolution being subscribed, is of very great importance, but you will excuse me for saying the conditions stated in the case put—of the Almada and Tirito Company—are just those which make it immaterial to the debenture-holders, as it leaves them 19*s.* 11*d.* in 1*l.* in any case, which view is taken. That our able solicitor—Mr. J. Arthur Morgan—can throw some light on the subject I do not doubt, and it is to the interest of both shareholders and debenture-holders that he should publicly state their relative position in the event of liquidation. He will probably do so in the current week's Journal but I write thus early that it may not be said my remarks are influenced by his observations, and if he can answer me in a supplementary note I shall be glad.

The example given in last week's Journal encourages a begging of the question, since it is assumed that 2030*l.* is available to pay off the 2030*l.* of issued debentures—the slight difference of 5*s.* is not worth consideration—but it is far more likely that if a sale were forced the whole property would not realise 3000*l.*, for one can scarcely suppose the resident managers, well knowing their declaration that the mines are surface mines and worked out would deprive them of their positions and salaries, would make so damaging a declaration without due consideration. The working over of the old men's burrows can only be a temporary expedient for raising funds, and would soon be exhausted, whilst the fact of the burrows being rich is rather confirmatory of the adverse view than otherwise; it proves that the old men's surface works were rich, that they were enabled to throw away better stuff than the company has obtained by going deeper, and that now the mine has been altogether unbottomed. If we had a few more mine agents ready to sacrifice their salaries rather than mislead the shareholders, capitalists would be more ready to make experimental trials, and the amount of mining dividends would be much increased.

Now, assuming 8300*l.* of debenture capital to have been created, 2030*l.* to have been issued, and 3000*l.* to be the amount of realisable assets in the event of a wind-up, we should have an example which would put the real question at issue in a clearer light. It would be most unjust for the debenture-holders who have only subscribed an amount which is perfectly useless for accomplishing the object in view to claim repayment in full, and it is most unjust for the directors to sacrifice the subscribers for the 2030*l.* worth of debentures merely to retain a banker's balance to keep a moribund concern in existence, unless they consider the 2030*l.* repayable in full. It is said, and no doubt rightly, that the Court of Chancery would probably uphold the rights of the shareholders, so that only 732*l.* 10*s.* 7*d.* would be distributable among the holders of the 2030*l.* worth of debentures, or rather less than 7*s.* 3*d.* in the 1*l.* The remaining 2267*l.* 9*s.* 5*s.* would be distributable among the shareholders, and on the 30,000 shares would give about 1*s.* 6*d.* per share, so that it is unlikely the shareholders would sacrifice their claim without a struggle. Now, to expect either shareholders or debenture holders to subscribe with a prospect of getting 7*s.* 3*d.* in the 1*l.* return appears puerile, and to continue to load the capital account by the issue of either shares or debentures appears to be false policy.

The remedy of the present difficulty appears to be to form a new company, and make a fresh start altogether. The present market value of the entire concern is 3750*l.*; the debentures issued are 2030*l.*=5780*l.*, which should be made the purchase money for the property. The capital of the new company should be fixed at

12,000*l.* in 1*l.* shares, of which 5780 should be allotted to the present share and debenture holders, which would leave 220*l.* for cost of reconstitution, and 6000*l.* for working capital. The interests of the shareholders would thus remain as at present, the debenture-holders would have a marketable share instead of a debenture, the repayment of which they cannot obtain without litigation, and probably not with it, and both shareholders and debenture-holders would be benefited by the 6000*l.* new capital brought in; whilst if 6000*l.* prove insufficient to bring the mines into a dividend condition the views of the present resident agents will be confirmed.

Dec. 26. DEBENTURE-HOLDER.

NOVEL ELECTRIC APPARATUS.

SIR,—As much interest is at the present moment taken in the question of electric illumination, and as it has been several times stated in the *Mining Journal* that what is required is not so much improved lamps and candles but a cheaper and more reliable method of generating the current, perhaps you will permit me to draw the attention of your readers to the improved electric apparatus invented by Mr. Alexis Cance, of Paris, which I am the better enabled to do because that apparatus has been patented in England, and the specification has just been published. I regret the translation into English has been made by a foreigner, and is not, therefore, very exact, but I also am incompetent to improve it, seeing I have not the command of the French original. The invention is a new electro-magnet, which may be employed as a direct agent to a new style of motor, and also for telegraphs, electric light, and any other purpose for which electricity is capable to be employed. The object of Mr. Cance's arrangement is to collect all the advantages offered by the influence of an induced current in soft iron. Previous theories and experiments have shown that inasmuch as the influence of an induced current diminishes as the coil of the conducting wire gets distanced from the rod or cylinder of soft iron magnetised under that influence, therefore it is almost unnecessary to increase indefinitely the number of coils around the cylinder, inasmuch as the current has the tendency to diminish. But in the new electro-magnet made according to Mr. Cance's invention it has been tried to make the best use of all the influence of an induced current, while at the same time increasing the magnetising surface. For this purpose he employs, as in ordinary electrodes, a bar or a bundle of small central bars, which carry a certain number of coils of conducting wire on the whole of its length, with the exception of a small space towards the top, and another space also at the base. It may not be absolutely necessary to have one or more rows of wire adherent to this first coil, but it may be made with (say) two rows. This first operation being done he places longitudinally close to each other a first series of small rods, which touch each other, and also the first coil; this second operation done he again winds the conducting wire on this first series of rods, and so on to an undetermined number of series of rods, as well as of rows of intermediate conducting wires placed spirally around each series of rods, commencing with the central rods, or to an undetermined number. This conducting wire remains always without being jointed to the exterior of the bobbin; this is done by means of a passage between two rods of each series. The size of the soft iron rods, as well as the size of the conducting wire on the bobbin, may be increased or diminished at pleasure.

By this new and easy mode of intercalation of soft iron into the circuit of the induced current an increase of magnetic surface is obtained, and by the employment of rods a general increase, and with little expense, from an electro-magnetic bobbin. Different shapes of rods may also be employed, such as cylindrical, triangular, rectangular, or any other shape, but always having small sectional surface, in order to construct with economy electro-apparatus of any geometrical shape, according to the use this new apparatus is destined for. Two of these bobbins being so prepared, they are fitted with a ring or collar at their base, in order to help the adhesion of each bobbin with the armature, which unites the two bobbins. This bobbin is fixed to the armature by means of countersunk screws. Another collar is placed at the top of each bobbin in order to hold the last coil of wire. The conducting wires are previously covered with a coating of shellac or other similar material in order to protect them, and at the same time to give them an even surface. This operation is repeated also to the base of each bobbin. In this new system of electric motor or electro-magnet increase of magnetic surface on the electro-magnet is obtained by the means of small rods of all shapes placed by series of either a circular, rectangular, triangular, or other shape in the circuit of an induced current made of rods, as centre of bobbin, and made with any number of series of rods, and any number of rows of conducting wires placed between the series of rods.

As I have said before that this improved system of electro apparatus may be applied to all kinds of motors, I will give an example of it:—This electro-motor is an application of the improved electro-magnet with a modification, consisting in the suppression of the armature uniting the two bobbins, and instead of acting as magnetic action on the two poles on the same plane it acts on the poles of opposite planes. On a cast-iron frame are fixed two standards, each having at top a bearing. In these two bearings revolves a shaft, provided at its centre part with a barrel or nave made of bronze of wood. This barrel or nave is provided with five double armatures, that is to say, each armature is of any required length, bent at its extremity to an angle of 90°; then, on a perpendicular line to the shaft, and at the centre of frame, is placed at any required height in the middle of this line a standard, which receives the first bobbin or electro-magnet. To the right and left of this middle standard are two other standards; these are placed at even height to each other, but higher than the middle one; these standards carry each an electro-magnet; the middle standard carries also an electro-magnet. These three electro-magnets are fixed to their standards by means of strap stays, which are tightened by screws or nuts. By the disposition of these three electro-magnetic bobbins and that of the five armatures an immediate rotation is obtained.

To introduce successively the current from a battery in each of the bobbins a commutator of a new construction is employed, but before describing it I must explain the reason why five armatures and three bobbins or electrodes are employed, and also why these five armatures are somewhat double; and, at last, why in this motor, the electrodes are simply bobbins presenting at their ends surfaces of magnetised iron in all their diameter. It has already been mentioned that by the employment of the rods of soft iron a very great surface of magnetisation is obtained, and that that surface spreads very near to the last coil of the bobbin, and if I insist on the details it is in order to demonstrate that acting tangentially as attractive means this system of electro-magnets presents all the advantages possible, whereas the diameter of magnetisation is not limited, inasmuch as by increasing the bobbin the magnetic surface is proportionally increased. I conclude by saying that on an electro of a diameter of 30 centimetres, including the conducting wires, there is at the least 14 centimetres of attraction. For this motor this mode of attraction is preferred to any other mode, and with three bobbins only and five bent armatures is obtained an immediate rotation. By the junction of the three axes of the bobbins a triangle is produced, and besides the line or surface of the armatures, which produces a tangent by means of the bobbins, passes through the axis of the driving shaft, which causes that all the thickness or width of the armatures gets away from the axis parallel to the tangent, and the rotation takes place immediately, because that when by this disposition one of the five armatures is in a tangent position one of the remaining five is at the axis of one of the bobbins, and so on successively for every bobbin and armature.

The commutator is simply a circular copper disc divided into 15 regular parts insulated from each other; the result of this is that the current passes 15 times at each revolution of the shaft, and this number being divided by three to cause each bobbin to give five times the passage of this same current. This circular disc provided with 15 surfaces is fixed in a wooden disc grooved at each side. Behind the copper disc are fixed by means of screws three copper hoops having five arms; each of these arms forms contact with five surfaces of the circle or disc. These five-armed circles or hoops are superposed and insulated from each other, and they all respectively correspond by a conducting wire with one pole of each bobbin. The three other poles of the bobbin are united in one conducting wire only, which corresponds with the electric source. To effect the passage of these 15 currents into the commutator a roller is provided, which receives motion from the shaft of the apparatus, and this roller forms contact upon the circle or disc, which is divided in 15 parts, and as the insulated space between each surface of the circle or disc, is very short the contact of the roller is still existing upon one of the surfaces that it is already communicated to the surface which precedes. A conducting wire is in communication with the roller, and the same wire communicates with the electric battery, and thus forms the other pole of the battery.

The new electro-magnet is thus not only applied as motive power, but the invention also includes a new arrangement of electric motor, as well as a new system of commutator. For this new disposition of electric motor may also be employed ordinary electro-magnets, and also any kind of electro-magnets without two opposite coilings. As this system may be considered as only a single bobbin with magnetic surface at both ends, the invention is intended to cover the employment of armatures bent at their ends, of any shape, whether horse-shoe or angular, or otherwise, as well as the new arrangement of commutator, the aim of which is to employ only a single distribution or roller travelling on surfaces insulated from each others, whatever may be their number, and whether the roller travels on a divided circular disc or on a divided cylinder. In the construction of this apparatus iron has been described for the armature as being the cheapest, but if steel be employed instead, causing these armatures to become ordinary magnets, and the passage of the currents be modified, an electro-magnet will be produced, which also forms part of these improvements.

The only question is the amount of power required to work the machine to its maximum force, and this I believe Mr. Cance can answer satisfactorily.—*Paris, Dec.* 21. INGENIEUR.

ROCK-DRILLING MACHINERY.

SIR,—That Mr. H. Williams's statements are so much in character with his former letters—totally untrue—I do not purpose to occupy your valuable space further than to say that his knowledge which "by dint of great perseverance he has arrived at" is like his knowledge of boring machinery—a sham and a farce. Mr. Williams says "H. W." and "Engineer" are one and the same. I am not aware that I ever saw "Engineer," and much less know him, nor did I write any letter signed "Engineer," as you, Mr. Editor, can verify. So much for Mr. Williams's veracity. His statements respecting sinking a shaft at a cost of 100*l.* per fathom are in character. Imputations of skulking in the background with one's hat down over one's eyes every man there knows to be untrue. There was a direct descendant of the Darwinian theory prominently at the front who by his chatter and self-assurance, so characteristic of his family, retarded others from coming to the front so readily as they would have wished. The month preceding the entrance of the boring machine at West Basset the men drove the same end 6 fathoms. Within a week the ground became 30 per cent. easier; yet they drove not 1 fm. more. Why the boasting? "Where ignorance is bliss 'tis folly to be wise." There would be no difficulty in finding the same number of men to drive the ground at West Basset as fast as the Eclipse drill has yet done if the same price were paid. I do not purpose to pay any further attention to the remarks of Mr. Williams. I wait the result. May the mountain bring forth something more than a mouse.—*Dec.* 23. H. W.

ROCK-BORING MACHINERY.

SIR,—I cannot, with your permission, allow Mr. Edwards' remarks to pass unnoticed. That gentleman would fain make your readers believe that he is so exceedingly clever, whilst all others are stupid, and cannot understand what they see or read. I have carefully read Mr. Edwards' specification of 1874, and also studied his drawings with same, and I again say there is not the slightest similarity between that and the Eclipse drill in any way, shape, or form, although Mr. Edwards seems extremely anxious that your readers should believe him in preference to anyone else. That gentleman must not imagine that impartial readers are to be debarred from explaining their views upon such matters, more especially when those views are based upon a thorough practical knowledge of the subject. I also see in Mr. Edwards' reply to Messrs. Hathorn and Co., in last week's Journal, a statement to the effect that the Eclipse drill has not seven, but only five ports, the same as his own. On examination of the Eclipse drill drawings I find the seven ports most distinctly shown, and am surprised that so sharp a hand as Mr. Edwards should make such a blunder, but perhaps the old proverb that "none are so blind as those who will not see" holds good in this case; but I will refrain from making any further remarks on this point as the matter does not belong to me, my object being merely to see fair-play between man and man. G. COOK.

Millwall, Dec. 26.

DEVON SILVER-LEAD MINE.

SIR,—I am much obliged to "C. E." for pointing out what was, as he suggests, a *lapsus* on my part. I can assure him, and your readers who may have taken the trouble to read my letters, that I had no desire to fall into the exaggerated style of expression. The substitution of the word "halvan" for "lode" was not only unintentional but unconscious on my part. So far from my desiring to exaggerate, I trust "C. E." will have seen that I have both as respects the halvans and the lode understated. Combining the two, I have taken off the following from the facts—

Lead 1557 tons, at 3*l.*	£ 4,661
Silver 31,140 ozs., at 4s.	6,228
Total	£10,889

Or, in other words, in addition to the legitimate profit to be derived from the halvans and one lode, I have thrown in twice the amount of the purchase money, 5000*l.*, to leave a very comprehensive margin for contingencies on the one hand, and increased profits on the other. I have a letter this morning from a mining and civil engineer in Cornwall, who appears to be acquainted with the mine, certain parts of which he is very anxious to see tried. I cannot give his name without his permission, and probably he may favour the readers of the Journal with his opinion of the mine. I heartily wish he may do so, for nothing is more desirable than that every statement made with respect to any mining property should be thoroughly tested, and as the writer is personally unknown to me his testimony to the value of the mine will be all the more valuable.

I am not in a position to give "C. E." the information he asks for as to how much lead has been taken out of this mine. Judging from the halvans I should say a very large tonnage has been extracted. I must confess my attention was more concentrated upon the present economical aspect of the mine than of its past history, and that aspect was so very extraordinary that I really did not care much about the past. Queen Elizabeth once asked an accomplished courtier what he thought of the beauty of the ladies of her Court? and he, knowing how much her Royal Highness liked a little flattery, told her it was impossible to judge of stars in the presence of the Sun! So, I fear, the richness of the halvan and the splendid character of that rich lode, made me altogether oblivious of the past development of the mine. I was speaking to a friend of mine, a mining engineer of large experience, and a native of Cornwall, though he has been many years located in this district, and he told me of one instance where splendid results had been obtained from a silver-lead mine by working and dressing the halvans. We only want capitalists to be inspired with confidence in working first-class mining adventures, and we shall see ere long the inauguration of a brighter era for this country.

"C. E." says he would like a dash of politics. He cannot do better than study the address of the American President Hayes. That accomplished and practical man tells us that they have had a very bountiful harvest, and that confience is being restored and trade is improving. Well, we have had a very excellent harvest. 1878, with all its cruel experience, will soon die out. Let us hope that 1879 will quietly open with more confidence and more trade, and that the present fearful distress and suffering will not only be mitigated but speedily come to an end, and with a revival of trade an increase of wages, a new Parliament and a Liberal administration, with Lord Hartington in the Commons, and Mr. Gladstone transferred to the House of Lords, we shall not only see a decrease in expenditure, but such an expansion of trade and commerce as will, in 1880, show a large balance in the imperial exchequer; and that the world is not coming to an end, but that we should be running a cycle of years of unexampled prosperity, be at peace with all other nations, and that all complaining may cease in the land, and all classes schooled and disciplined by past bitter experience may learn and carry into practical effect sound and wholesome lessons for the general good.—*Ulverston, Dec.* 23. WILLIAM SALMON.

THE TIN MARKET.

SIR,—The valuable letter of your correspondent Mr. S. L. Bensusan, of the Kangaroo Tinworks, has exposed the unscrupulous conduct of the author, who caused the insertion of the paragraph which appeared in an evening contemporary—the existence of a mountain of tin containing 10 ozs. of gold to the ton, which was said to exist at Mount Heemskirk. To all thinking men and men of experience the statement carried its own confutation, but this has not prevented the fabrication reaping an advantage by frightening consumers, and thereby starving the miner through the further depreciated prices.

We have tin brokers' circulars issued broadcast recommending buyers to stand aloof, notwithstanding that tin is little more than one-third of the price of six years ago, and 30 per cent. below the average of twenty years; that no metal has been applied to such an increased variety of uses during the last three years, while the extraordinary production has almost been equalled by increased consumption, the stocks in London amounting to only about six months consumption; that about 600,000*l.* would buy up the entire stock at the present market price. Were that stock to decrease 40 per cent. what would tin be—not 60*l.* nor 80*l.*, but 100*l.* per ton? Is it, then, a dream that tin must increase in value, seeing that there are but two or three Australian or Tasmanian mines now paying the cost of production and yielding any profit to their proprietors; that the profit made on home mines is a bagatelle. Surely the authors of such circulars ignore all laws of political economy, and permit their personal feelings and bearish inclinations to mislead the public to their aggrandisement. This brings me to ask what is the origin of the so-called committee of the Metal Exchange? Is this committee elected by the general body at a general meeting, or a self-elected one, or one society of friends? Who are they? Does production stand represented on that committee to quote prices to suit their own books or orders? Is any smelter of tin, copper, lead, or iron represented there, or is any agent of any such firm there? Or are they brokers, speculators, or gamblers possessing a power by their real or false quotations of prejudicing the market to their individual interest? It would be curious to know the origin of the statement *re* the mountain of tin. It would not be far away doubtless from the office of him or them who could benefit most by putting tin still lower at the time of its circulation. Although the lie has travelled the circuit of the earth, its contradiction has not reached all who heard it. Wealth, position, and the representatives of hundreds of thousands dedendent on metal mining surely have a right to demand that they shall be represented and consulted in the quotations of that which they are the *bona fide* vendors rather than they who live on the fluctuations they can create on ½ per cent. brokerage. If confidence be to exist in the quotations and transactions of the Metal Market, let producers be represented by an annual election from the general body of members. If not, their position is *infra dig*, and one they ought not to tolerate for a day. OBSERVER.

Liskeard, Dec. 23.

"STRIKES."

SIR,—A very sensible and dispassionate letter appeared in the Journal of last Saturday from Mr. William Salmon. The miners on "strike" and others would do well to read it, and meditate thereon. There is no doubt the principal cause of the present wide-spread distress in this country should be ascribed to the strikes, particularly in the coal and manufacturing districts. The tin and copper miners in Cornwall were not so foolish as to follow the example of the Nortnerners, but their distress was originated by the low prices of minerals, which occasioned the reduction of wages, and the stoppage of mines in great numbers. It is said, "Experience is a dear school, but fools will learn in no other." It is to be hoped the sad experience which the miners and artisans have endured, and are now enduring, in consequence of strikes will have taught them effectually a lesson never to be forgotten. It has I think taught them that no ultimate good can accrue from strikes; that in all cases the men are, and have been, losers thereby; and that, therefore, they had better keep working for the most they can get by a quiet and peaceable arrangement with their masters. Employers, as a rule, are reasonable men, and disposed to pay their workmen what they can fairly afford. Strikes have disturbed the natural order of things, driven trade out of the country, pauperised thousands of employers, and bankrupted many merchants—the result in a great measure of the men implicitly acting upon bad advice when they ought to have exercised their common sense, if they had any. The strike of the miners in Devon Great Consols, by which they lost several thousands of pounds in wages, was a much greater loss to them than to the company. Employees should remember that employers can better afford to do without them than they can do without employers. They should on this account consider their masters, and not attempt to over-rule them. I would say to workmen—"If you do not like your masters leave them, but never combine to do mischief."

Truro, Dec. 24. R. SYMONS.

CARDIGANSHIRE MINES—CWM BRWYNO.

SIR,—It is gratifying to be able to state that since I wrote you last on this property the new course of steel-grained ore found in the 80 (all the other courses of ore found in the mine being that of the nature of common galena, although carrying a good many ounces of silver to the ton) continues to improve, and as this is entirely a distinct course of ore from the western, which is 170 fms. long, I should not be surprised to find it carrying with it a greater portion of silver than is contained in the ore broken from that bunch. The stopes and other bargains also continue to open and develope most satisfactorily. For some time we have been looking forward to great and grand results from mines a little to the north of this that have been reported on during this year as only waiting the completion of a large resorvoir to enable large returns and profits to be made, and have also mines reported as yielding 4 tons of rich ore per fathom, and another as yielding at the rate of 60*l.*, 50*l.*, 40*l.*, and 30*l.* per fathom; but, from what may now be gathered from their present costs and returns, I shall be much surprised if Cwm Brwyno does not make more profits than the whole lot during 1879.

Goginan, Dec. 24. ABSALOM FRANCIS.

FRONTINO AND BOLIVIA MINING COMPANY.

SIR,—The meeting summoned for Tuesday next is for the purpose of reviewing the transactions of three half-years, and, as another half-year literally expires on the very day of the meeting, it may almost be considered that we have to review the transactions of two years. I call this a very easy going style on the part of the directors, and I think our directorate may be set up as a perfect model for directors who are that way inclined, for I believe that sometimes it has not been possible to form a quorum (at any rate without hunting for a stray director or two), although we are charged 750*l.* per annum for fees, besides 369*l.* odd for management and general expenses. By the way, I have a strong suspicion that our Chairman does nearly the whole work. I am sorry that I cannot congratulate our directors on a very brilliant success, but rather have to condole with them on somewhat doleful results on the year and a-half—might I not say two years—working, and I have a very strong opinion that we should have what is called a little fresh blood on the occasion of filling the vacancies of the two retiring directors, especially when we have lately witnessed the disastrous consequences of trusting to what is practor a self-elected and unchangeable directorates, not that I question if moment think of excluding our Chairman, as I

we could possibly get a better. I will not trespass further on your valuable space except to suggest to the directors that the shareholders are not all infants, some at least having arrived at the age of discretion, and, therefore, think they have a right to some voice in the management of the affairs of the company rather oftener than the directors seem to consider necessary. ENQUIRER.

THE WILD DUCK, OR SPORTSMAN'S ARMS.

"This," says Uncle Henny, "is Xmas weather, like old times; an I believe 'tes twice so healthy as a lot of rain and wild weather; and so well as I can mind 'tes twenty-three year ago since we had so much frost and snow before. I think, comrades, we ought to be thankful that we are spared to see another Xmas, and to mit again in good health, and for the good denner we've jest had and a comfortable room and a good fire, and while Jan Temby is beating up the eggs for the eggy-hot, I'll tell ee what I've ben thinken about lately, of things when I was a youngster. Well, I was put to work when I was seven years old, like scores more of poor little fellows, my neighbours—no going to school then till you were fourteen! Why, I was took in the *concarn* with a pare of tributers when I was fifteen, and worked in my early days in Wheal Abram and Wheal Crenver! We hear people complaining bitterly every day of the 'bad times,' but if the worked and lived as I ded when I was a youngster, I don't the would grumble much, for 'tes true, comrades, that the people in the 'Union Workhouses' fare sumptuously every day when compared with the living of the people in my rearing. The breakfast then was milk and water boiled, with a little flour or grits to thicken it, and barley bread; for denner a barley hoggan; and when we come home our supper was 'pilchers and taties.' Sometimes by way of a feast there was a salt knuckle of pork, boiled with a lot of leeks in a great pot of water, this was lickey-broth. A loaf of white bread was not sen in the house but twice a year, and that was Feaster Sunday and Xmas Day. I know many families of nine or ten reared up to men and women in a house 12ft. by 15ft., with the bedroom the same size, without any divisions or partitions, where the all slept, and still the people dedn't grumble or complain; and many of the families, with such a living, worked out of core, hacked up old downses, and built tidy houses for themselves. The dressed in plain clothes, and paid for them. When I think of those things, and the dress and living of workmen now, 'tes enuff to frighten anybody, for if you are to judge people by their appearance going to market or fair, or to the different places of worship, you will say, if the poor people are anywhere—they are out of sight, the don't appear in public. When I was working in Wheal Abram Capt. Andrew Vivian was manager, as able a miner as ever lived in Cornwall, he was also a great engineer, and with Capt. Henry Vivian assisted Capt. Trevithick in making the *first* steam railway carriage and running it through the streets of Camborne! With Capt. Andrew Vivian the agents in Wheal Abram and Crenver wor old Capt. Philip Richards, young Capt. Phill, Capt. John Richards, Capt. Nichs. Vivian, and others; the got fine profits out of these old bals, and when the got poor, like sensible men, the know'd when to stop. I've often heer'd it said that a more able set of agents and engineers wor never sen than in Wheal Abram, and when I heer'd a few years ago that the old bal was going to work again, I said sure'y the must be mazed men, or don't know who last worked the old bals, or the would never throw away their money like that. 'Oh!' but somebody said, 'there was a world of tin left in the old stulls.' I could a told them 'twas no such thing, and that there wor so good tinners in the old worken as ever lived, but who would believe the truth from an old working miner. Well the forked the old bal, and found her so poor as Job. No tin in the stulls, and lost money enough to work several young good bals. I must say 'it sarved them right,' and I hope it will be a warning to the public never again to risk a shilling in a deep old bal, especially when you know the names of the managers, agents, and engineers." "Now, Uncle Henny," says Jan Temby, "I'll be spokesman for the rest, and thank ee very much for your speech. So take this cup of eggy-hot, it es prime stuff, and will stick to your ribs, and do ee a world of good." "It es fust-rate stuff sure enuff," says Uncle Henny, "and I'll propose that Jan Temby do make another jug, for 'tes mighty feeding stuff." "And," says Old Tom, "a glass of rum tipped into un would make'n more lively like." This was agreed to. "And now," says Uncle Henny, "Jan Jewell being next to me, I think he'll be able to give us a little speech." "I'll do anything in my power to make a pleasant, comfortable mitten," says Jan. "Well, comrades, I too, like Uncle Henny, was put to work when I was barely seven years old, and what I suffered from wet and cold I can never forget, for I was put to work with the 'streamers' in Porkellis Moor, and worked there till I was a brave, hardy youngster, and then went to work underground with tributers in Wheal Foster and Wheal Trumpet. I worked a good bit, too, in Wheal Trannack, when she was rich for copper. I've often wondered that there is not more doing in Gwendron Bals. If you only think of the tens of thousands of pounds worth of tin that wor got out of Porkellis Moor Stream Works. It ought to satisfy people that if the only traced away, and worked all the then lodes, the would do a purty lot better than throwing away their money searching for tin in furrin countries; and now I think of it I suppose 'tis 50 year ago, I was employed to show the boundaries of Medlyn Moor sett. Capt. W. Thomas, who was then a young man, took the run of the lodes, and made a plan, and old Capt. Pryor, father of Capt. Dick, was there too, and after the bal finished—I shall never forget it—Capt. Thomas, who is in Ireland, said 'I don't know, old Capn., what your opinion is, but it strikes me that this is a valuable sett.' 'Golls, then,' said old Capn. Pryor, 'I quite agree in your opinion, Capn. Will, and if this sett is properly worked, there being a number of lodes, in easy ground, it will make a rich mine.'" "I believe," says Jan Jewill, "that very near the spot where we three stood that day a valuable discovery of tin was made a few weeks ago." "Very good," says Jan Temby, "now here's a cup of grand stuff for thee, old boy. Drink that, and we'll have another speech or a 'kerl." "Jemmy Dowa," says Uncle Henny, "used to belong to Forest Gate choir, and I'll agree that we lev it to un to make a little speech, or sing a 'kerl,' which ever a got a mind to," so Jemmy, after clearing his throat a bit, begun and sung that fine old "kerl"—

"While shepherds watch their flocks by night."

"That's well done," says Old Tom, "and I hope Jemmy will give another before we break up." "Send in your cups," says Jan Temby, "I'm ready with more prime stuff." After a little while, Uncle Henny said, "I'm sure Jan Temby will say something to keep up this pleasant little mitten." "I'll do anything in my power," says Jan, "and I may as well tell ee at once that I was like the rest, put to work so soon as I could lift a shoul and many a bitter day did I suffer from cold and wet at the Cairn entral old stompses. If we wor wet through going to work we had to stay so all day, and when we went home there was not half fire enough to dry our clothes, so we had to put on wet things for days running. At last I went to work underground in the valley district, Dolcoath, and while working there 'Polgine' was put to work. This, I think, must be more than 50 years ago. I was with a pare of men clearing the adit east, as everybody thot great riches would be found under the 'old workens,' but when we got there we found that 'Betty adit' was drove across 'Newton Moor' (Wheal Grenville) to 'old Polgine,' and that it was jest 6 ft. deeper than the adit coming from the west, so the 'old workens' wor all dry, and poor enuff. The sumpmen at this time wor a fine lot of men. There wor Martin Bennetts and Henny Marks, the great wrestlers, Joe, and Jimmey Stephens; they four men wor more than 6 ft. in their vamps Then there wor Tom Nicholas and Henny Adams. I've seen the six of them come up through Freeman's shaft cling to the capstan rope like a straw of onions; the wor the quietest and most agreeable pare of men I ever mit; the used to drink in this very house. Martin Bennetts was a fine handsome man, but his 'mother longed for a barley-hoggan,' and there a wor sure enuff growing under his chin. I've see'd it hundreds of times. At last Martin went in one day to old Dr. Lannine, and he cut off the hoggan, but the fine fellows are all dead now. I think 'tes about 20 year ago since I mit the last manager of Polgine, who was home on a visit; we happened to mit at Troon. 'Well, Jan,' said he, 'what's your opinion of the old bal?' 'Why,' says I, 'I don't think much about'n going east.' 'I'm very much of your opinion,' says he, 'but from Freeman's shaft west,' says he, 'there is a rich bal for tin and copper, and I'm surprised it has not been worked long ago.' Now, comrades I worked in this ground, and know 'tes true what he said." "So ded I," says old Tom, "and people could get money there with the now low price for tin and copper." "I know'd," says Uncle Henny, "that Jan Temby would tell us somethen worth harken' to, and 'tes not likely that keen old triburers like he and old Tom could be mistaken; so fill your cups once more, comrades." Cousin Will now said, "I have seen with my own eyes the miserable food our people lived on at the time so truly described by Uncle Henny, and also the wretched houses in which large families were reared years ago, and I cannot help remarking that it is a monstruous sin that rogues, thieves, and vagabones are fed, clothed, and housed in our prisons a thousand times better than our working, industrious population, and our Members of Parliament ought to insist on having so great an abuse of the public money put an end to. There is room also for improvement in the workhouse system, for numbers who pay poor-rates are by far worse off than a great number of the lazy inmates. I will say a word, however, before we part on a more pleasing subject; for altho' tin and copper is still low, I am certain we can beat foreigners, and unless they can get a much higher price than the present it will not *pay* to work the Australian and Tasmanian mines. Many are already closed. Our colonists are too keen-sighted to play a losing game. So we have seen the worst of low prices and bad times, and let us all learn a useful lesson by it. I now with great pleasure wish you all a Merry 'Xmas; but wait a moment." On the signal being given in came Becky with a steaming bowl of punch, and then followed the Forest Gate Choir, who sang some Xmas anthems in fine style, and so ended the last and most pleasant mittin for the year 1878.—*From Cousin Jack's Unpublished MSS.*

Meetings of Public Companies.

ALMADA AND TIRITO CONSOLIDATED SILVER MINING COMPANY.

The seventeenth half-yearly general meeting of shareholders was held at the offices of the company, Finsbury Circus, on Friday, Dec. 20,—Mr. WM. MARTINEAU, M.I.C.E. (the Chairman) presiding.

Mr. J. ARTHUR MORGAN, F.G.S (solicitor and general manager) read the notice calling the meeting.

The CHAIRMAN said that when they met six months ago they had lately changed the management, and appointed Mr. J. H. Clemes as chief engineer and general manager, and had sent out a new man (Capt. Morcom) as assistant engineer and underground captain, with instructions that they were to prepare a joint report on the mine. That report was now before the shareholders, and also the separate report of Capt. Clemes. He thought the shareholders would agree with him in thinking that those reports were the reverse of cheering. In some respects those reports were not altogether what the directors hoped they would be; he did not mean as regarded their tenour, because Capt. Clemes and Capt. Morcom were bound to tell exactly the truth, but there was an absence of recommendation. (Hear, hear.) He thought they should have recommended, or told the directors a little more clearly, what was best to be done. Those two reports seemed to have been made at the very worst time, and certainly they had painted things as dark as they very well could. Since the receipt of those two reports the directors had received letters and information which showed a somewhat more hopeful state of things. Those letters had been only just received, and there had not been time to print the slips and send them round; but he would read extracts from these letters, which would throw a little more light upon the report:—

TIRITO, NO. 1 LODE.—Capt. N. C. Morcom, Nov. 4: The lode in the end driving north has become valueless, which is for the time being suspended, and the men are put to stope the bottom of the level, where a productive lode has been discovered. This lode appears of a very irregular character as to productiveness: in fact, it is the case with all the mines in the district.

LA VIRGEN.—Nov. 4: This stope is productive of green and black ores. The green ore is found on the west side of the lode, and has a width from 6 to 9 feet (*i.e.*, the lode) and a length of 30 ft. A stope 6 ft. high has been put forth on the green part of the lode, and has been productive of a very fair quantity of good ore. Our next operation will be to take down the black ore part of the lode, which is about 2 ft. wide, and then fill up the excavation with deads or waste from above. The length of ore ground on this part of the lode is very short; consequently, we must push a trial drift through the poor part of the lode further north, where I am strongly impressed ore is to be found.

PROVIDENCIA.—Nov. 4: On the whole, there appears to be a little improvement in this large green ore stope, situated now near 50 ft. above tunnel level.

SAN JOSE SHAFT.—Nov. 4: A tackle has been fixed in San José shaft, and the roadway is being secured, in order to work the little ore in sight on tribute. A considerable quantity of work has been done at this point heretofore, but attended with bad results. Judging from present appearances we have no bright future to anticipate at San José.

MINA GRANDE.—Nov. 4: There is a slight improvement in the end driving north in the big stope below tunnel level. The end south in the 15 fm. level having become poor, the men are put to stope the back of the level. There has no change worthy of notice taken place in the stope in the back of this level. The old men's workings taking away from the back of tunnel level are productive in yielding a considerable quantity of green and black ore. Our hope is that the old workings will long be a source of profit to us.

CRUZ VERDE.—Nov. 4: The end driving north is still productive of green ore. The stope has fallen off a little in value. The end driving south has a branch of very good ore. The ground is very hard to drive through. A little ore has been found in cutting down the shaft. Part of the bottom of the shaft is in old workings, and a part solid ground.

There was a telegram which ought to be read in connection with that, which was as follows, dated Nov. 9:—

Improvement on docile ore stopes. We have remitted you bullion.

Those extracts were from Capt. Morcom's report. He would now read Capt. Clemes' report on the same:—

The marked improvement in the Providencia and Virgen stopes will increase our bullion yield. All the solid parts of ore in the 15 (Mina Grande) are separated for shipment. The dredgy portions are sent to furnaces. There is no difficulty in securing a good chlorination roasting for these ores, they being mixed with acid ores to such an extent that the percentage of lead entering the ovens is low.

ASSAYS.	Ounces.
Sample of best work from new tribute pitch, docile ore	59·79
Lixiviation tailing	4·37
Quartzose red rock from first lode, Tirito, supposed to contain silver	11·67
Sample of spalled ore from 15 (Mina Grande) separated for shipment, solid	109·37

The first on the above list is from a new tribute pitch on old men's workings, Tirito, at surface; the quantity obtainable is limited. Anyone judging only by the eye the ore from this place would throw it over the dump as worthless. The third assay in the list was made with a view to prove whether an iron-stained quartzose rock occurring in the first lode Tirito could pay to buddle.

With regard to the refuse heaps, they were not alluded to much in the report, but it was such an important feature that he should have to say a few words upon it. In the refuse heaps there was an immense quantity of stuff thrown over, and if there were anything like the amount of productive valuable ore in it which Capts. Clemes and Morcom seemed to imagine, those refuse heaps should be very valuable to support the company for some time to come. The old miners were not able to reduce the black ores, but threw them over, and also filled up the old workings with attle, and the old workings were filled with valuable ores. The directors had given distinct instructions to those two officers to report, as precisely as they could, as to the extent and probable amount of valuable ore which there was in those refuse heaps. It might be necessary to trench the heaps to examine them lower down, and they were to use every means to give the directors a correct estimate of the amount, as near as they could tell, of the valuable ore which was there, and also an estimate of the expense of reducing the same. If there were a very large amount of valuable ore it might be advisable to erect furnaces on a somewhat larger scale, but this would not be done unless the directors had complete grounds to go upon. All this ore, if valuable, was practically given to the company, as there was no expense for raising it, and if they could go on reducing it and making a little money, they could provide themselves with funds to carry on the explorations of the mine. (Hear, hear.) As regarded the accounts, the shareholders must bear in mind that the loss covered the who'e of the exploratory works. It was not quite right to say that it was all loss, as a great part had been expended on exploration, which was deadwork. The directors had received advices up to November, and as far as they could see they would conclude this half-year possibly with a loss, which at any rate would be very small. The directors considered that the company was holding its own, and he should not be surprised to find that there was a small profit, so that their financial position at the end of the half current year would be no worse than six months ago. (Hear, hear.)

A SHAREHODER: It might be better.—The CHAIRMAN: It might be. They had two months' working before them, therefore if that were the case when they were not working these waste heaps to any large extent, if they were able to work the waste heaps and reduce a large quantity of ore, they might gradually accumulate a little money, which might go to help the explorations which might be carried on. The policy of the directors would be to utilise those burrows and heaps as far as possible, and by that means give themselves time for those explorations which they had every reason to hope might yet be productive of good results in some parts of the mine. There was nothing special in the accounts which called for remark, but he should be happy to answer any questions which any shareholder might wish to ask. In conclusion, the Chairman moved the adoption of the report and accounts.

Mr. J. P. GEORGE SMITH, of Liverpool, seconded the resolution.

Mr. S. J. WILDE said he had recently been to see Jordan's drill at work; it cut between 50*l.* and 60*l.*, with duplicate parts, two men could work it, and it cut about 1½ in. a minute through granite, and much cheaper than by hand. Since then he had heard of another and cheaper drill, and a company with which he was connected had bought six of them and sent out to India. These machines, or rather tools, cost ten guineas each, and the company he referred to expected to gain great economy from their use. He hoped the directors would take the subject into consideration.—The CHAIRMAN said the board would do so. Possibly the drills referred to would be worth trying.—Mr. WILDE said that a small quantity of water was required in their use to wash the debris from the lode. The firm of John Taylor and Sons had informed him that they did their work well. Referring to the accounts, he said the company was worse off financially than they were twelve months ago; of course, a great deal of that had been expended in exploratory work, and, therefore, it would not be proper to say it was loss, but at any rate they had 700*l.* less to spend. His first impression on reading the report was that it would be better to wind-up as soon as possible, but from the conversation which he had had since with the managing director, and also from having read the reports which had come in since, he had changed his opinion on that point. Like the Chairman, he was disappointed that the joint report did not contain more recommendations as to what was best to be done. The only feature of brightness was the chance of getting something from the burrows and attle which had been left behind. Their predecessors had not been able to reduce the ores, but this company had done so, and as the attle was there, without any cost for raising, he thought that seemed a bright feature in the company.

A SHAREHOLDER: We have money enough to go on for another year?

The CHAIRMAN: Certainly.

A SHAREHOLDER: Then I do not think there is any occasion to wind-up at present. If we have money enough to go on another year that certainly makes a great difference.—The CHAIRMAN said that, with regard to the drilling machines, it might be worth while to send one out, as it would be very desirable to do everything possible to cheapen the work. The last remittance of ore and black precipitate from the lixiviation process, which was on its way, was valued at about 1200*l.*, and a telegram has been received intimating another shipment. He might mention that he had received a letter from Mr. Swaffield, the auditor, who was unable to be present, in which he stated that he looked upon the large quantity of ore contained in the "burrows" as a source of revenue for some time to come. As regarded the money, there was no doubt there was sufficient to go on for another year, and if what he had shadowed forth about the reserves were correct, he hoped things would look brighter in another year.

A SHAREHOLDER said he was greatly disappointed on first reading the report, but from what he had heard since he thought the prospects were more encouraging, and certainly there was no occasion to-day to discuss the question of winding up.

The report and accounts were then adopted, and a vote of thanks having been passed to the Chairman and directors, the meeting broke up.

CHICAGO SILVER MINING COMPANY.

The annual general meeting of shareholders was held at the offices of the company, on Thursday, Dec. 19,

Colonel BYRDE in the chair.

The SECRETARY having read the notice convening the meeting, the report and accounts were taken as read.

The CHAIRMAN stated that since the last meeting the question at issue between the company and the owners of the Herschel Mine, adjoining the Flavilla, had been compromised. The terms of the compromise included the lease of ground in dispute for three months, conditional upon their not extracting a greater amount of ore than would realise $10,000 net; in one sense it was very encouraging to the directors to find that during that period they had extracted that amount, as it proved the mine was valuable. Since work had been discontinued the company's agent in Salt Lake City—Mr. E. F. Dunne—had leased the old Flavilla works to a Mr. Brooks, who had prospected for a distance of from 150 to 160 feet. He had also leased one smelter for six months and the other mines. The directors had tried to secure favourable terms to settle the debts due by the company with a view to a resumption of smelting, but it would also be necessary to raise some fresh capital before the company could start, as we should necessarily be compelled to pay cash until our credit was re-established in Utah. He deeply regretted to have to announce the death of the Hon. J. C. Stanley, who had been a director of the company from its commencement, and was always very zealous in the discharge of his duties. Major-General Davison had resigned his seat at the board owing to his having left London. The directors had elected Mr. A. Joy, a large bond and shareholder, to a seat at the board, and he would come before the meeting for re-election. He concluded by moving:—"That the report of the directors be and is hereby adopted, and the accounts approved."

Mr. HYNDMAN, in seconding the resolution, stated that he had recently seen a gentleman from Utah who was interested in the company, and from the tenor of his conversation he had no doubt that the present lessee of the Flavilla had been doing much better than our agent had supposed, and there appeared no doubt that a profit had been made by the lessee all along, and that he was at the present time in ore. He thought that if we could secure a certain supply of customs ores in the vicinity of our works, which, he understood, there was a probability of our being able to, it would be advisable to start one or two furnaces, as lead had increased in price from £26 to £32, and they could also smelt much closer now than used to be the case, and instead of losing 15 or 20 per cent., the loss now by competent smelters would not exceed 3 or 4 per cent. Many smelters in Utah were now at work, and taken altogether things looked more promising if we had funds to start with.

A discussion ensued upon the general affairs of the company, and the directors were requested to endeavour to get those shareholders who had not taken their proportion of debentures to do so now. The resolution was then passed, as were the following:—That Mr. A. Joy be and he is hereby re-elected a director of this company.—That Mr. Meggy be and he is hereby re elected auditor for the ensuing year, and that his remuneration be 15*l.* 15*s.*—That the thanks of this meeting be presented to the chairman and directors.

[For remainder of Meetings see to-day's Journal.]

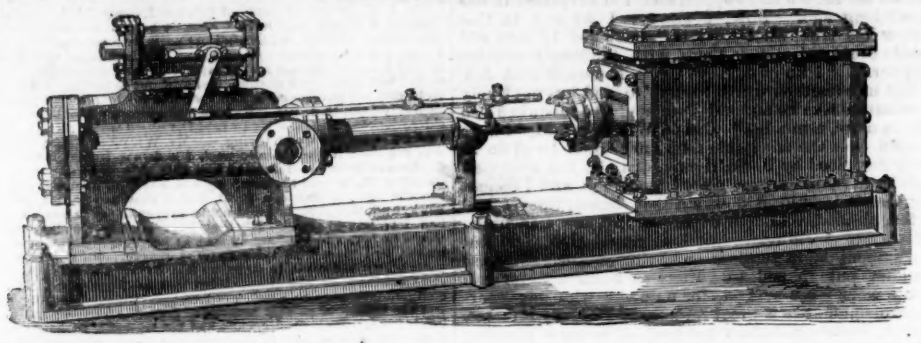
THE EMMA MINE.—In the Common Pleas Division of the High Court of Justice on Friday, before Mr. Justice Denman, the case of the Emma Silver Mining Company *v.* Lewis and Son was further heard, the argument being on the motion made on behalf of the defendants to enter judgment for the defendants on the ground that, with respect to the counts relating to conspiracy on which the jury had found for the plaintiffs, there was no evidence to go to the jury. The Attorney-General, Mr. Gorst, Q.C., Mr. Charles Bowen, and Mr. Foulkes appeared for the plaintiffs; and Sir Henry James, Mr. Herschell, Q.C., and Mr. Collins for the defendants. Counsel addressed the Court on both sides at great length, and his Lordship intimated that it would perhaps be convenient if he gave judgment, supposing he was able to give any judgment, either during the circuits or at any other time. Counsel assented, and the Court rose.

TALARGOCH MINE.—An inquest was held at the Miners' Arms, Meliden, on Tuesday, by Mr. R. Parry, Coroner, on the body of Evan Williams, miner, who lost his life on the previous Saturday from the explosion of a charge of dynamite when at his work in Talargoch Mine. The dynamite had become hard, and the deceased to facilitate charging the shot-hole placed the dynamite in a tin on two stones over a lighted candle, with the intention of softening the charge by the heat from the candle, and sat down near it on a barrow to eat his lunch; a sudden explosion took place, with fatal effects upon the deceased, and considerable injury to the son, who was at work with his father. The inquest was adjourned.

NEW WATER ELEVATOR.—An improved apparatus has been constructed by Mr. H. SKYFORTH for utilising the pressure of ammonia vapour at a high temperature for the raising of water. Whilst 100° centigrade produces the pressure the reduction of the temperature to 60° centigrade effects a reabsorption of the gas and produces a vacuum. The apparatus consists of a series of cylinders from which the gas is driven through pipes into the water chamber, bringing a pressure of 7½ atmospheres on the surface of the water, which is thus forced upward and stored in the usual way.

UNIVERSAL SAFETY APPARATUS.—The improved safety apparatus invented by Mr. L. L. STIELER, of Stolp, Germany, consists of two eccentric wheels on the same axle, having between them a third wheel eccentric in the opposite direction, this latter being placed in the centre of a metal bar, which being projected from the elevator passes through two guides running from the top to the bottom, and fastened to the wall; the end of the bar passing through the guides is provided with a wooden shoe-piece overlapping the guides on each side. It will thus be seen that upon the wheels turning towards the guides they will become wedged between the latter and the wooden shoe on the inside. The wheels are held in their normal position by straps or like devices passing up to the head-piece, this piece being allowed some play in a bearing slot. Thus should the rope part the head-piece will fall as far as the slot will allow it, thus liberating the wheels, which being driven by a spring will turn toward and be wedged between the guides.

HATHORN, DAVEY, AND CO.'S EXHIBITS AT THE PARIS EXHIBITION.



MESSRS. HATHORN, DAVEY, AND CO.'S EXHIBITS AT THE PARIS EXHIBITION.

Messrs. Hathorn, Davey, and Co., of Leeds, had at the Paris Exhibition an interesting group of pumping machinery. The exhibit, though a small one compared with some others, was awarded a gold medal, the highest award given for English pumping machinery. The exhibit consisted of a differential pumping-engine, a differential steam-pump, and two of Davey's patent hydraulic pumping-engines.

THE DIFFERENTIAL PUMPING-ENGINES was one of a pair made for the Chiswick Local Board, and of a design specially suited for waterworks and sewage pumping purposes. The engine was a compound condensing engine, with the cylinders placed in a vertical position direct over the pumps; the two pistons being coupled together by means of a wrought-iron beam. The cylinders are 10-in. and 20-in. diameter, by 3 ft. stroke, and are steam jacketted. The design of the engine is very neat and compact, and attracted a good deal of attention in the Exhibition. The other exhibits we are enabled to illustrate through the courtesy of the makers.

THE DIFFERENTIAL STEAM-PUMP.—This is a new form of the differential steam-pump (Davey's patent), illustrated above. In their former steam-pumps of small sizes this firm had only used the differential valve gear in an incomplete form to lighten its cost; in the new type they have succeeded in applying the complete gear in a way at once simple and inexpensive. The whole arrangement is clearly shown in the engraving. The slide valve (a common D) is placed above the cylinder, and in one piece with it are two pistons, one at each end, working in cylindrical prolongations of the valve box. The outer ends of these cylindrical chambers are connected by ports with a small valve chest placed besides the other, in which works a small D-valve. The main valve is connected by a link to the upper end of the working lever (its stroke being adjustable by varying the position of the connecting pin in the slot shown); a pin a few inches lower down on the lever is fixed to the cross-head of a cataract piston, and guided in a straight line, while the lower end of the lever is connected to an arm on the main piston and pump rod. The subsidiary valve is worked from the lever by the button and stop arrangement shown. The action of the gear is easily understood; the auxiliary valve being opened by the stop at the end of the stroke admits steam behind one of the pistons, and connects the other with the exhaust; this steam opens the main valve and keeps it moving forward at a rate determined by the cataract piston, which, of course, commences to move at the same time as the main slide: steam is thus admitted to the main piston, and the lower end of the working lever commences to move with it, the tendency of its motion being to close the valve. Cut-off then takes place, as in the differential pumping-engine, at a point determined by the rate at which the closing motion of the cross-head overtakes the opening motion given by the steam acting directly on the main slide.

The automatic control which this gear exercises over the motion of the pump is as perfect as in the differential pumping-engine, even extending like it to the total removal of the load from one side of the piston, in case of an accident. The full speed of the pump is 120 ft. per minute, but it will work quite steadily at one or two strokes per minute if required. The pump has a diameter of 8-in., and a stroke of 2 ft., the diameter of the steam cylinder being 12 in. The maximum delivery is 250 gallons per minute. The pump valves are india-rubber discs, which the makers use for heads up to 150 ft.; above that height they use single or double beat valves with leather beats. The workmanship of the pump is thoroughly good, and we understand that it is made at a price but little above that of the ordinary direct-acting pumps, without any controlling or expansive arrangement.

THE HYDRAULIC PUMPING ENGINE (Davey's patent).—These engines are adapted to situations where a small quantity of water supplied under a considerable pressure can be economically used to pump a larger quantity of water against less pressure. In the dip workings of collieries, for instance, engines thus worked are advantageously used to raise water to the main pumping-engines, the motive power in this case being supplied from the rising column of pipes in the pit. In hilly mining districts water from a high level on the surface may be conducted by pipes down the pit into the mines, and then used to raise a greater quantity of water to the surface, thus avoiding the necessity for steam-power.

This engine has been designed to obviate the difficulties of wear and tear experienced with engines having pistons and slide valves. Pistons and slide valves wear very rapidly with dirty water, but plungers are practically unaffected. It will be seen that in the engine illustrated there are no pistons, but the power is applied and the work done entirely with plungers. The power plungers are stationary, and are made to serve as pipes to convey the water from the valve box—to which they are fixed—to the pump plungers, the latter forming the power cylinders, being connected to each other by side rods passing outside the valve box. In this way the forcing stroke of one pump plunger causes the suction stroke of the other, and *vice versa*.

The most novel part of the engine is the valve box. For hydraulic power no valves answer better than single-mitre valves, for if these valves do get leaky because of sand and grit they are easily replaced by duplicates, or ground tight. The difficulty with single-mitre valves of the ordinary type is, however, that of working them when made of sufficient size to produce but little throttling. This difficulty is entirely obviated in the engine under notice, for the valves, instead of being actuated by means of metallic connections, are worked under water pressure by means of a small subsidiary valve acted upon by the differential gear from the engine. On this construction the valves may be made of any size, and a full and free waterway given, so as to realise the greatest possible useful effect. By regulating the passages between the subsidiary and main valves the latter are made to rise and fall at any required speed, so that the beat may be entirely taken off, and the wear and tear of the valves reduced to a minimum. Each plunger communicates with a chamber in the valve box fitted with one inlet and one exhaust valve. The valves—which are of gun-metal, working on gun-metal seats—have plungers formed on them from above and below, the lower plungers being packed with double-cupped leathers, as shown, while in the case of the inlet valves the upper plungers are also packed with cupped leathers. The lower plungers are thus really the rams of small hydraulic presses, and by admitting water under pressure below them the valves are lifted. Diagonal passages connect the plunger chamber of the right-hand exhaust valve with the plunger chamber of the left-hand inlet valve, and *vice versa*.

Altogether, we think that the plan of using hydraulic pumping-engines in the manner to which we have referred has not received the attention it merits. Metallic mines are frequently situated in hilly districts. In many of those mines the use of steam-power for pumping might be altogether avoided by the adoption of hydraulic pumping machinery, the latter possessing, amongst other features, the advantage that in the event of the mine being flooded it would continue to work under water.

THE HYDRAULIC PUMPING-ENGINE.—This engine is a modification of the larger hydraulic pumping-engine above described. It is specially designed for draining the workings of mines which are situated below and at a distance from the pumping shaft. A small pipe is taken from the column of the main pumping-engine to the hydraulic engine, and another pipe conveys the water pumped and the water used by the hydraulic engine to the pit sump.

Numbers of these engines are in successful operation in the Northern and Midland coal mining districts. M. E.

MOVABLE TRAMWAYS.—In carrying the invention of the Rev. J. J. HALCOMBE, of Balsham, into effect the vehicle may be arranged to run upon three or four wheels, preferably three, the under carriage with the front wheel or wheels being arranged to turn upon a perch bolt, as is well understood, for the purpose of enabling the vehicle to be turned and guided as required. The rails or tram plates, upon which the wheels run, are formed of broad plates with a raised edge or flange at each side thereof. Upon each side of each wheel is mounted a horizontal rod or shaft supported at its extremities in slotted frames, which allow of the said rods or shafts moving slightly from side to side as the vehicle moves in other than right lines. Upon these rods are hung the rails, which are not only capable of running freely from end to end of the rods, but are also capable of turning out of the way to enable them to pass clear of the wheels whilst being drawn forward into position for use. For this latter purpose two or more drums and pinions are mounted underneath the body of the vehicle, and one rail on each side of the vehicle is fitted with a rack, which takes into the pinion, whilst the wheel of the vehicle is passing along such rail, and thereby gives motion to its drum, by means of which the other rail is moved into position in front of the advancing wheel of the vehicle. The rails are moved out of the way of the wheels by means of a curved bar or suitable guide acting upon suitable connections as the rails are moved forward. The supporting rods or shafts of the front rails are carried by the under carriage, by which means he causes the rails to be laid in the path of the leading wheel or wheels.

ANTIFRICTION BEARINGS.—In the construction of an antifriction bearing, Mr. J. C. THOMPSON, of Brooklyn, proposes to employ a number of rollers placed inside the journal or axle box, as heretofore, but instead of placing the axle in contact with such rollers he interposes a loose rotating collar or bush, the outside of which runs in contact with the rollers, whilst the inside fits and runs loosely on the shaft or axle. If desired the axes of the rollers may, as has heretofore been proposed, work in slots formed in wheels or rings, so as to retain the rollers equidistant from each other.

METAL WHEELS FOR CARRIAGES.—The object of the invention of Mr. L. S. PASCAND, of Rue de Vaugirard, Paris, is to do away with the nuts, counternuts, and screw cuttings in the naves, felloe, or spokes, or any other means hitherto used for regulating the tension of wheels, the spokes of which are made of a single metal wire, and consists for constructing the wheels of light carriages, and chiefly of bicycles, with spokes made of two or more metal wires, so that the tension of the spokes or of the wheel may be controlled by twisting the spokes thus constructed more or less on themselves. The said twisting may be performed by means of a single or several twisting centres between the two ends of the spokes. Whether it be performed by one or other end of the spoke, or by both ends at the same time, and in whatever manner, the spoke may be secured to the nave or felloe of the wheel. The torsion may be effected in constructing the wheel by means of pincers, nippers, hand vices, or tumblers, which are removed when the wheel is completed; or else by means of small bars or levers, which may be left in place by connecting two spokes to each other, or be removed when the spokes are made of steel, the twisting of which, once performed, is maintained by tempering.

HOLLOWAY'S PILLS.—INDIGESTION.—In all cases of indigestion, producing weariness, low spirits, palpitation, and feverishness, these famous Pills should be resorted to as the gentlest and surest corrective of the stomach, and the best antidote to its ailments. These pills dispel the cause of dyspepsia; everyone afflicted with it may rejoice at the safe and satisfactory results which can be secured at so small a charge as the purchase of a box of Holloway's Pills. They purify, strengthen, and remedy imperfect development of growth and health in your persons. Thousands of Sufferers, who casually commenced a course of Holloway's Pills, have admired their restorative power themselves, and afterwards recommend them with a fixed confidence which has never been betrayed.

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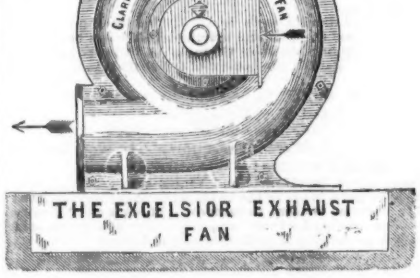

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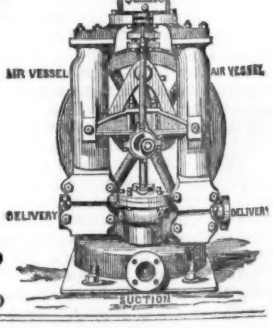

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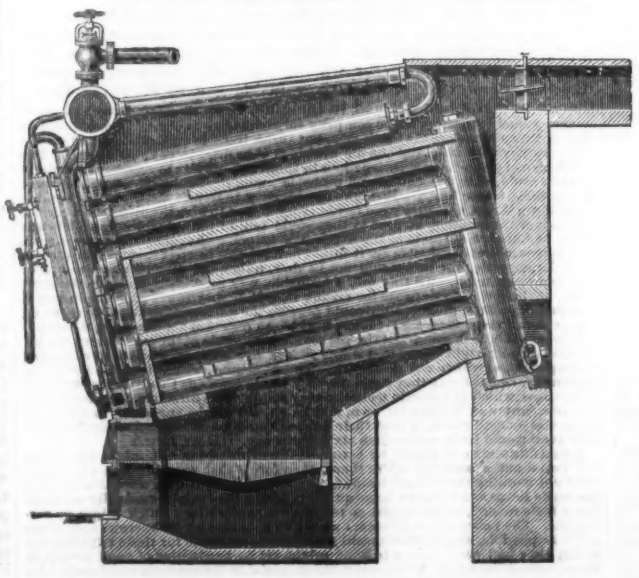
BARROW SECTIONAL BOILER.



THE BARROW SHIPBUILDING COMPANY beg to call the particular attention of Steam Users to the great advantages to be obtained by adopting their Improved Sectional Boilers. After the most careful experiments extending over some years, and having worked these Boilers in their own workshops under the most varying conditions, and subject to the most crucial tests, they have every confidence in recommending them to the public.

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AND ARE THE SOLE MAKERS OF

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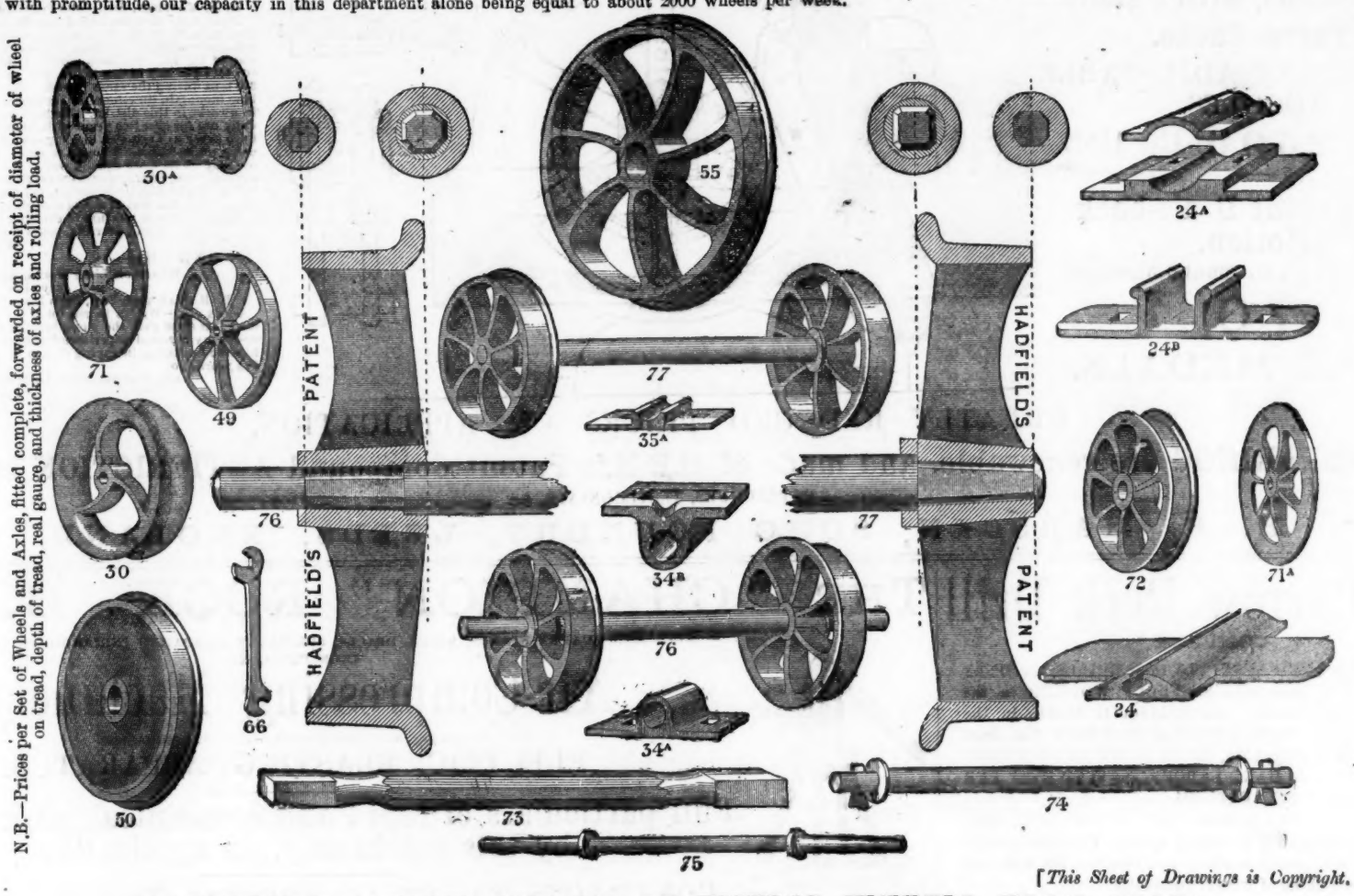
One of our departments is specially adapted for the manufacture of these Wheels (as shown below), for Collieries, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., &c. We have made, and are now making, many HUNDRED THOUSANDS; and having Patented a New Method of Fitting Wheels upon axles, being cheap, effective, and expeditious, we can execute orders entrusted to us with promptitude, our capacity in this department alone being equal to about 2000 wheels per week.



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HADFIELD'S PATENT METHOD OF FITTING WHEELS UPON AXLES.

The advantages of the above system are that the Wheels being forced upon a Taper Square-ended Axle, by Machinery, and then riveted (the machine securing truth), it is impossible that they can come loose or get within gauge. They are very heaply fitted on, and run exceedingly true.

We construct the Arms of wheels upon the curved principle (as shown in the drawings above), consequently the shrinkage or cooling of the Castings is not interfered with, thus securing the greatest advantages of our very strong material.

CRUCIBLE CAST-STEEL WHEELS, when cast by us, are made from one-third to one-half lighter than Cast-Iron. They cannot be broken while working, even with rough usage, and will wear at least twelve times as long as Cast-Iron, thus saving animal and steam power, and reducing wear and tear immensely.

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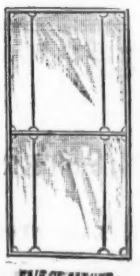

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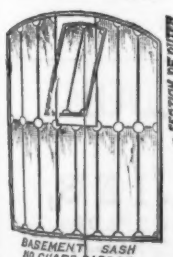

In Basement Storeys and Exposed Positions Shutters and Guard Bars are dispensed with.

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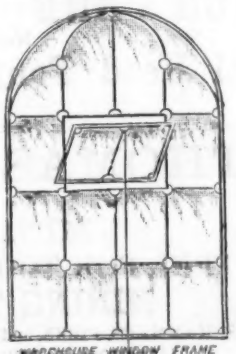

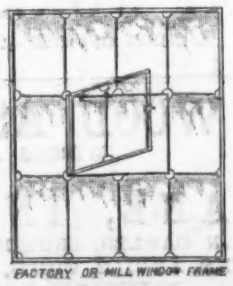

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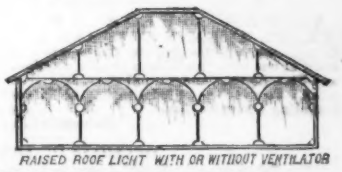

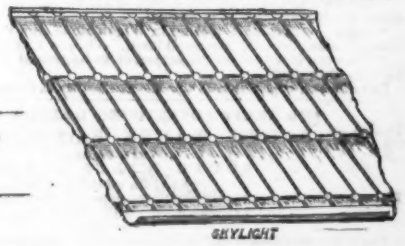

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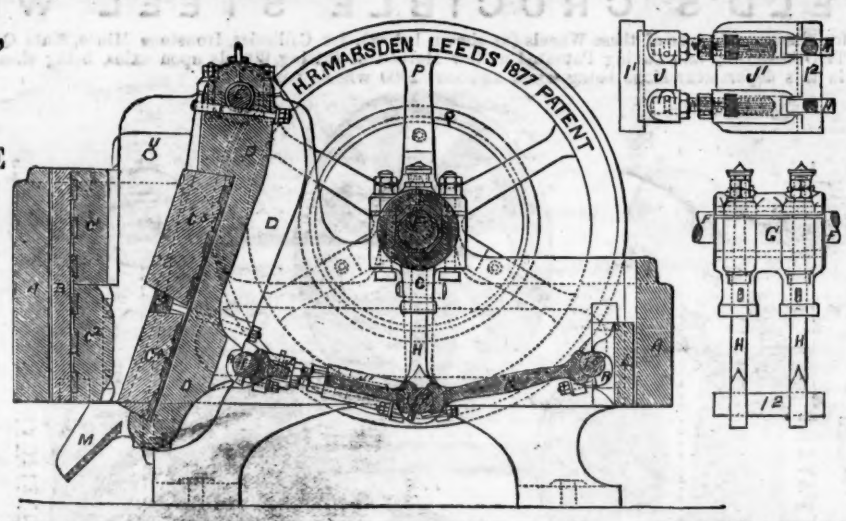

READ THIS—

Wharthole Lime Works, Maryport, Whitehaven, November 7, 1873.

H. E. MARSDEN, Esq., Soho Foundry, Meadow-lane, Leeds.

DEAR SIR,—The machine I have in use is one of the large size, 24 in. by 12 in. The quantity we are breaking daily with this one machine is 250 tons, the jaw being set to break to a size of 2¼ in. We have, however, frequently broken over 300 tons per day of ten hours, and on several occasions over 360 tons during the same period. The stone we break is the blue mountain limestone, and is used as a flux in the various ironworks in this district. We have now had this machine in daily use for over two years without repairs of any kind, and have never had occasion to complain of any inconvenience in using the machine. I hope the one you are now making for me may do its work equally well. The cost—INCLUDING ENGINE-POWER, COALS, ENGINEMAN, FEEDING, and all EXPENSES OF EVERY KIND—is just 3d. per ton. Should any of your friends feel desirous of seeing one of your machines at work, I shall have much pleasure in showing the one alluded to.

I am, dear Sir, yours very truly,
WILLIAM MILLER.

AND THIS—

Wharthole Lime Works, Aspatria, Cumberland, July 11th, 1878.

H. R. MARSDEN, Esq., Soho Foundry, Leeds.

DEAR SIR,—We are in receipt of your letter of 4th inst. I may just state that the stone breaker above named has been under my personal superintendence since its erection, and I have no hesitation in saying that it is as good now as it was five years ago.

I am, dear Sir, yours faithfully,
FRANCIS GOULD.

GREATLY REDUCED PRICES ON APPLICATION.

ALL BEARINGS are renewable, and made of H.R.M.'s Patent Compound ANTIFRICTION METAL.

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In ordinary ends two machines may be worked together, and at a proportionately increased speed. They are strong, light, and simple, easily worked, and adapted for ends and stopes, and the sinking of winzes and shafts.

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BICKFORD, SMITH AND CO., of TUCKINGMILL, CORNWALL; ADELPHI BANK CHAMBERS, SOUTH JOHN-STREET, LIVERPOOL; and 85, GRACECHURCH-STREET, LONDON, E.C., MANUFACTURERS AND ORIGINAL PATENTEES of SAFETY-FUSE, having been informed that the name of their firm has been attached to fuse not of their manufacture, beg to call the attention of the trade and public to the following announcement:—

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